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Geological problems of Novaya Zemlya (west of the Russian Arctic)

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Novaya Zemlya is an important ranging mark for extrapolation of its geological structures features on the surrounding shelf which is perspective for hydrocarbons. The fold structures of archipelago which are made up of the Paleozoic rocks, rarely of the Neoproterozoic and the Lower Triassic rocks, were created by the post-Permian orogenesis. A well-study and a good exposure of a geological cross-section and a geologic structure allow to judge about features of a structure, geodynamics of this territory and history of the geological development. However there are debating points. The main debating points: 1) age of the basement of the Northern block of Novaya Zemlya and the lithogenesis features of the Vendian -Silurian paleobasin where many kilometers sediments were collected; 2) a role of the Caledonian orogenesis in the geological history of the archipelago; 3) relationships between structures of the Ural Mountains and Novaya Zemlya and reasons of Novaya Zemlya early Cimmerian folding.

1) At the least, two blocks are separated by the features of the basement. The Southern block is composed of metasediments of greenschist facies and created by the Timanian orogeny, expressed by an angular unconformity between the early Vendian of the Cambrian period and the Ordovician period and now confirmed by the zircon measurement data. The other is the Neoproterozoic Northern block. This block was created by an earlier age orogenesis with microblocks of the early Riphean period crystalline rocks. The data of this zircon measurement can be treated in different ways. At last, on the North of the archipelago on the Vendian phyllites the Cambrian and the Silurian period turbidites and molasse deposits with the thickness to the 7-8 km are characterized by trilobites and graptolites and deposited without visible unconformity. Features of the sedimentology of the Vendian -Silurian paleobasin and the age and structure of the basement that underlie a Cimmerian (Vendian-Permian) infolded megacomplex aren't clear.

2) Along the western coast of the Central archipelago the chain of rises stand out on geologic-geophysical materials and drilling data (Admiralty and etc.). Zircon measurement data confirm what during the second half of the Cambrian– Silurian periods these raisings delivered to the east, i.e. to

Novaya Zemlya, detrital material. On this stratigraphic level numerous unconformities from Neoproterozoic tops on the early Silurian period are fixed that is the result of the Caledonian orogeny in the west-northwest of Barentsev plate.

3) The main difference between the Ural Mountains and Novaya Zemlya development is consist of the Ural Mountains in a result of oceanic crust evolution, and the Paykhoysko-Novozemelsky depression is the intracratonal structure. According to one representation, when Urals paleocean was closing, in the late Devonian period to north from Ural some rift structures (Novaya Zemlya, Taimyr) were formed. Perhaps, they were connected with each other, but later they were separated by faults and overthrusts. The overthrusts were connected with a deep diapirism (Permian-Triassic basic magmatism) in the Kara Sea like a compensation folding of Novaya Zemlya. According to another model the post-Permian folding of Novaya Zemlya is explained by interaction of microplates. There are also other models.

The solution of these problems will give a possibility to create consistent geodynamic model of this part of the Arctic that is important for the forecast of oil and gas prospectivity.

